



# *Common Market for Eastern and Southern Africa*



## **EDICT OF GOVERNMENT**



In order to promote public education and public safety, equal justice for all, a better informed citizenry, the rule of law, world trade and world peace, this legal document is hereby made available on a noncommercial basis, as it is the right of all humans to know and speak the laws that govern them.

COMESA 204 (2006) (English): Wood –  
Determination of ultimate strength in static  
bending

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**ISO INSIDE**  
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COMESA HARMONISED  
STANDARD

COMESA/FDHS  
204:2006

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**Wood — Determination of ultimate strength in  
static bending**

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REFERENCE: FDHS 204: 2006

## Foreword

The Common Market for Eastern and Southern Africa (COMESA) was established in 1994 as a regional economic grouping consisting of 20 member states after signing the co-operation Treaty. In Chapter 15 of the COMESA Treaty, Member States agreed to co-operate on matters of standardisation and Quality assurance with the aim of facilitating the faster movement of goods and services within the region so as to enhance expansion of intra-COMESA trade and industrial expansion.

Co-operation in standardisation is expected to result into having uniformly harmonised standards. Harmonisation of standards within the region is expected to reduce Technical Barriers to Trade that are normally encountered when goods and services are exchanged between COMESA Member States due to differences in technical requirements. Harmonized COMESA Standards are also expected to result into benefits such as greater industrial productivity and competitiveness, increased agricultural production and food security, a more rational exploitation of natural resources among others.

COMESA Standards are developed by the COMESA experts on standards representing the National Standards Bodies and other stakeholders within the region in accordance with international procedures and practices. Standards are approved by circulating Final Draft Harmonized Standards (FDHS) to all member states for a one Month vote. The assumption is that all contentious issues would have been resolved during the previous stages or that an international or regional standard being adopted has been subjected through a development process consistent with accepted international practice.

COMESA Standards are subject to review, to keep pace with technological advances. Users of the COMESA Harmonized Standards are therefore expected to ensure that they always have the latest version of the standards they are implementing.

This COMESA standard is technically identical to ISO 3133:1975, *Wood — Determination of ultimate strength in static bending*.

A COMESA Harmonized Standard does not purport to include all necessary provisions of a contract. Users are responsible for its correct application.

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# INTERNATIONAL STANDARD



# 3133

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Wood — Determination of ultimate strength in static bending

*Bois — Détermination de la résistance à la flexion statique*

First edition — 1975-11-01

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UDC 674.03 : 539.384

Ref. No. ISO 3133-1975 (E)

**Descriptors :** wood, tests, bend tests, breaking load, flexural strength, physical tests, mechanical tests.

## FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3133 was drawn up by Technical Committee ISO/TC 55, *Sawn timber and sawlogs*, and circulated to the Member Bodies in June 1973.

It has been approved by the Member Bodies of the following countries :

Australia	Germany	Romania
Austria	Hungary	South Africa, Rep. of
Belgium	India	Sweden
Bulgaria	Ireland	Thailand
Canada	Italy	Turkey
Chile	Mexico	United Kingdom
Czechoslovakia	Netherlands	U.S.S.R.
Egypt, Arab Rep. of	Norway	Yugoslavia
France	Poland	

The Member Body of the following country expressed disapproval of the document on technical grounds :

Japan

# Wood — Determination of ultimate strength in static bending

## 1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for determining the ultimate strength of wood in static bending.

## 2 REFERENCES

ISO 3129, *Wood — Sampling methods and general requirements for physical and mechanical tests*.

ISO 3130, *Wood — Determination of moisture content for physical and mechanical tests*.

## 3 PRINCIPLE

Determination of the maximum load required to cause rupture of the test piece  $1,5 \pm 0,5$  min from the beginning of loading, and estimation of the stress at this load.

## 4 APPARATUS

**4.1 Testing machine** capable of measuring load to the nearest 1 %.

**4.2 Device** capable of ensuring bending of the test piece by applying a load to its side surface mid-way between the centres of the device supports. The radius of curvature of the supports and a loading shoe shall be 30 mm.

**4.3 Measuring instrument** capable of determining the cross-sectional dimensions of the test pieces to an accuracy of 0,1 mm.

**4.4 Equipment for the determination of moisture content** in accordance with ISO 3130.

## 5 PREPARATION OF TEST PIECES

**5.1** Test pieces shall be prepared in the form of right prisms having a square cross-section of side 20 mm and length along the grain of 300 to 380 mm.

**5.2** The preparation, moisture content and number of test pieces shall be in accordance with ISO 3129.

## 6 PROCEDURE

**6.1** Mid-way along the test piece, measure the breadth in a radial direction and the height in a tangential direction to an accuracy of 0,1 mm.

**6.2** Carry out the test with the ratio of the distance between the centres of the device supports and the test piece height being from 12 to 16. Apply the bending load to a radial surface of the test piece (tangential bending) mid-way between the supports.

**6.3** The loading of test pieces shall be carried out uniformly at constant speed. The speed of testing (at constant rate of loading or constant rate of movement of the loading head of the machine) shall be such that the test piece is broken in  $1,5 \pm 0,5$  min from the beginning of loading. Determine the maximum load  $P_{\max}$  to an accuracy which shall not exceed that specified in 4.1.

**6.4** After the test has been carried out determine the moisture content of the test pieces, when required, in accordance with ISO 3130.

Take, as the sample for the determination of moisture content, a portion of the test piece  $25 \pm 5$  mm long, cut from near the point of rupture. To determine the mean moisture content, it is permissible to use only some of the test pieces. Calculate the minimum number of test pieces for the determination of moisture content in accordance with ISO 3129.

## 7 CALCULATION AND EXPRESSION OF RESULTS

**7.1** The ultimate strength in static bending  $\sigma_{bW}$  at the moisture content,  $W$ , at the time of test is given, in megapascals, by the formula :

$$\sigma_{bW} = \frac{3P_{\max}l}{2bh^2}$$

where

$P_{\max}$  is the breaking load, in newtons;

$l$  is the distance between the centres of the supports, in millimetres;

$b$  is the breadth of the test piece, in millimetres;

$h$  is the height of the test piece, in millimetres.

Express the result to an accuracy of 1 MPa.

**7.2** When necessary, the ultimate strength in static bending  $\sigma_{bW}$  shall be adjusted to a 12 % moisture content to an accuracy of 1 MPa according to the formula :

$$\sigma_{b12} = \sigma_{bW} [1 + \alpha(W - 12)]$$

where

$\alpha$  is the correction factor for moisture content, whose value shall be obtained from national standards;

$W$  is the moisture content of the wood, calculated according to ISO 3130.

**7.3** The mean ultimate strength in static bending of the test pieces cut out from one piece of the selected material shall be calculated to an accuracy of 1 MPa as the arithmetic mean of the results for the individual test pieces.

## 8 TEST REPORT

The test report shall contain the following particulars :

- a) reference to this International Standard;
- b) details concerning sampling of the test pieces;
- c) details in accordance with clause 7 of ISO 3129;
- d) the test results calculated as specified in clause 7, and their statistical values;
- e) the value of the coefficient  $\alpha$  used for the adjustment of the test results to a 12 % moisture content.